

Serial No. 10/623,856
March 31, 2005
Reply to the Office Action dated December 7, 2004
Page 10 of 14

REMARKS/ARGUMENTS

Claims 1, 3-15, 18-21, and 23-32 are pending in this application. By this Amendment, Applicants amend claims 1, 3, 4, 15, 21 and 23, cancel claims 2, 16, 17 and 22, and add new claims 30-32.

Claims 1-3, 7, 8, 12, 15, 16, 21-23, 25, 26 and 29 were rejected under 35 U.S.C. § 102(e) as being anticipated by Barber et al. (U.S. 6,307,447). Claims 1-5, 7-11, 13-18, 20-23 and 25-28 were rejected under 35 U.S.C. § 102(e) as being anticipated by Tikka et al. (U.S. 6,407,649). Claims 1, 6, 15, 19, 21 and 24 was rejected under 35 U.S.C. § 102(e) as being anticipated by Larson, III et al. (U.S. 6,483,229). Claims 2, 16, 17 and 22 have been canceled. Applicants respectfully traverse the rejections of claims 1, 3-15, 18-21 and 23-32.

Claim 1 has been amended to recite:

**"A piezoelectric filter comprising:
a plurality of piezoelectric resonators including a substrate and a vibration portion provided on the substrate, the vibration portion having a structure in which top and bottom surfaces of a thin film portion including at least one piezoelectric thin film are sandwiched between at least a pair of an upper electrode and a lower electrode facing each other; and
an additional film provided on the upper electrode of at least one of the plurality of piezoelectric resonators; wherein
the additional film has susceptibility to physical etching that is lower than that of materials used for the upper electrodes of the others of the plurality of piezoelectric resonators."** (emphasis added)

Independent claims 4, 15, 21 and 23 recite features that are similar to the features recited in Applicants' claim 1, including the above-emphasized features.

Claim 7 recites:

**"A piezoelectric filter comprising:
a plurality of piezoelectric resonators including a piezoelectric substrate and a vibration portion having a structure in which the piezoelectric substrate is sandwiched between at least a pair of an upper electrode and a lower electrode facing each other; wherein
the upper electrode of at least one of the plurality of piezoelectric resonators is made of a material having susceptibility to etching that is**

Serial No. 10/623,856

March 31, 2005

Reply to the Office Action dated December 7, 2004

Page 11 of 14

different from that of the upper electrodes of the other piezoelectric resonators." (emphasis added)

Independent claims 8, 25 and 26 recite features that are similar to the features recited in Applicants' claim 7, including the above-emphasized features.

With the unique combination and arrangement of elements recited in Applicants' claims 1, 4, 7, 8, 15, 21, 23, 25 and 26, Applicants have been able to provide a piezoelectric filter in which the accuracy of frequency adjustment is increased and an improvement in efficiency of the adjustment operation is achieved (see, for example, the fourth full paragraph on page 2 of the originally filed specification).

The Examiner alleged that Barber et al. teaches all of the features recited in claims 1, 7, 8, 15, 21, 23, 25 and 26, including an upper electrode 40, 41 & 46, 44 of at least one of a plurality of piezoelectric resonators having susceptibility to etching that is different from that of the upper electrodes of the other piezoelectric resonators.

However, Barber et al. specifically teaches that the layer 46 is etched by reactive ion etching or other chemical etching. Barber et al. fails to teach or suggest anything at all about physical etching, or that the layer 46 has susceptibility to physical etching that is lower than the upper electrode of the other piezoelectric resonators. Thus, Barber et al. certainly fails to teach or suggest the features of "an additional film provided on the upper electrode of at least one of the plurality of piezoelectric resonators" wherein "the additional film has susceptibility to physical etching that is lower than that of materials used for the upper electrodes of the others of the plurality of piezoelectric resonators" (emphasis added) as recited in Applicants' claim 1, and similarly in Applicants' claims 15, 21 and 23. As clearly disclosed in the originally filed specification, the additional film is etched using ion milling (physical etching) (see the paragraph bridging pages 30 and 31 of the originally filed specification), which is very different to the reactive ion or other chemical etching disclosed in Barber et al.

In addition, the substrate 10 of Barber et al. is specifically disclosed as being made of a non-piezoelectric semiconductor material, such as silicon. Barber et al. fails

Serial No. 10/623,856

March 31, 2005

Reply to the Office Action dated December 7, 2004

Page 12 of 14

to teach or suggest that the substrate 10 could or should be made of a piezoelectric material. Thus, Barber et al. certainly fails to teach or suggest the features of "a plurality of piezoelectric resonators including a piezoelectric substrate and a vibration portion having a structure in which the piezoelectric substrate is sandwiched between at least a pair of an upper electrode and a lower electrode facing each other" (emphasis added) as recited in Applicants' claim 7, and similarly in Applicants' claims 8, 25 and 26. Applicants note that it appears that the Examiner has completely ignored the recitation of a piezoelectric substrate, since the Examiner has not even alleged that Barber et al. teaches or suggests a piezoelectric substrate.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 7, 8, 21, 23, 25 and 26 under 35 U.S.C. § 102(e) over Barber et al.

The Examiner alleged that Tikka et al. teaches all of the features recited in each of claims 1, 4, 7, 8, 15, 21, 23, 25 and 26, including an additional film of at least one piezoelectric resonator having susceptibility to etching that is different from that of the material of the upper electrodes of the other piezoelectric resonators. Applicants respectfully disagree.

Contrary to the Examiner's allegations, Tikka et al. fails to teach or suggest any etching of the upper electrodes or of an additional film. Thus, Tikka et al. fails to teach or suggest any relative susceptibility to etching between the additional film and the upper electrodes, and certainly fails to teach or suggest the features of "an additional film provided on the upper electrode of at least one of the plurality of piezoelectric resonators" wherein "the additional film has susceptibility to physical etching that is lower than that of materials used for the upper electrodes of the others of the plurality of piezoelectric resonators" as recited in Applicants' claim 1, and similarly in Applicants' claims 4, 15, 21 and 23.

Similar to Barber et al., the substrate shown in Figs. 5 and 7 of Tikka et al. is specifically disclosed as being made of a non-piezoelectric material, such as glass.

Serial No. 10/623,856

March 31, 2005

Reply to the Office Action dated December 7, 2004

Page 13 of 14

Tikka et al. fails to teach or suggest that the substrate could or should be made of a piezoelectric material. Thus, Tikka et al. certainly fails to teach or suggest the features of "a plurality of piezoelectric resonators including a piezoelectric substrate and a vibration portion having a structure in which the piezoelectric substrate is sandwiched between at least a pair of an upper electrode and a lower electrode facing each other" (emphasis added) as recited in Applicants' claim 7, and similarly in Applicants' claims 8, 25 and 26. Applicants note that it appears that the Examiner has completely ignored the recitation of a piezoelectric substrate, since the Examiner has not even alleged that Tikka et al. teaches or suggests a piezoelectric substrate.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 4, 7, 8, 21, 23, 25 and 26 under 35 U.S.C. § 102(e) over Tikka et al.

The Examiner alleged that Larson, III et al. teaches all of the features recited in each of claims 1, 15 and 21, including an upper electrode of at least one of the plurality of piezoelectric resonators that is made of a material 25, 26 having susceptibility to etching that is different from that of the upper electrodes of the other piezoelectric resonators. Applicants respectfully disagree.

Contrary to the Examiner's allegations, Larson, III et al. fails to teach or suggest any etching of the upper electrode materials 25, 26, or of an additional film. Thus, Larson, III et al. fails to teach or suggest any relative susceptibility to etching between the additional film and the upper electrodes, and certainly fails to teach or suggest the features of "an additional film provided on the upper electrode of at least one of the plurality of piezoelectric resonators" wherein "the additional film has susceptibility to physical etching that is lower than that of materials used for the upper electrodes of the others of the plurality of piezoelectric resonators" as recited in Applicants' claim 1, and similarly in Applicants' claims 15 and 21.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 15 and 21 under 35 U.S.C. § 102(e) over Larson, III et al.

Serial No. 10/623,856

March 31, 2005

Reply to the Office Action dated December 7, 2004

Page 14 of 14

Accordingly, Applicants respectfully submit that Barber et al., Tikka et al. and Larson, III et al., applied alone or in combination, fail to teach or suggest the unique combination and arrangement of elements recited in Applicants' claims 1, 4, 7, 8, 15, 21, 23, 25 and 26.

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1, 4, 7, 8, 15, 21, 23, 25 and 26 are allowable. Claims 3, 5, 6, 9-14, 18-20, 24 and 27-32 depend upon claims 1, 7, 15, 21 and 25, and are therefore allowable for at least the reasons that claims 1, 7, 15, 21 and 25 are allowable.

In view of the foregoing amendments and remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

To the extent necessary, Applicants petition the Commissioner for a One-month extension of time, extending to April 7, 2005, the period for response to the Office Action dated December 7, 2004.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

Date: March 31, 2005


Attorneys for Applicant

Joseph R. Keating
Registration No. 37,368

Christopher A. Bennett
Registration No. 46,710

KEATING & BENNETT LLP
10400 Eaton Place, Suite 312
Fairfax, VA 22030
Telephone: (703) 385-5200
Facsimile: (703) 385-5080